Q.1 WHAT IS MEANT BY RESEARCH TOOLS? WHAT ARE DIFFERENT TYPES OF RESEARCH TOOLS? (20)
Answer:-
RESEARCH TOOLS:-
Anything that becomes a means of collecting information for your study is called a research tool or a research instrument. For example, observation forms, interview schedules, questionnaires, and interview guides are all classified as research tools.

TYPES OF RESEARCH TOOLS:-
OBSERVATION:-
Observation is the active acquisition of information from a primary source. In living beings, observation employs the senses. In science, observation can also involve the recording of data via the use of instruments. The term may also refer to any data collected during the scientific activity. Observations can be qualitative, that is, only the absence or presence of a property is noted, or quantitative if a numerical value is attached to the observed phenomenon by counting or measuring.

OBSERVATION IN SCIENCE:- The scientific method requires observations of nature to formulate and test hypotheses. It consists of these steps:-
1. Asking a question about a natural phenomenon
2. Making observations of the phenomenon
3. Hypothesizing an explanation for the phenomenon
4. Predicting logical, observable consequences of the hypothesis that have not yet been investigated
5. Testing the hypothesis' predictions by an experiment, observational study, field study, or simulation
6. Forming a conclusion from data gathered in the experiment, or making a revised/new hypothesis and repeating the process
7. Writing out a description of the method of observation and the results or conclusions reached
8. Review of the results by peers with experience researching the same phenomenon

OBSERVATIONAL PARADOXES:- In some specific fields of science the results of observation differ depending on factors which are not important in everyday observation. These are usually illustrated with "paradoxes" in which an event appears different when observed from two different points of view, seeming to violate "common sense".

RELATIVITY:-
In relativistic physics which deals with velocities close to the speed of light, it is found that different observers may observe different values for the length, time rates, mass, and many other properties of an object, depending on the observer's velocity relative to the object. For example, in the twin paradox one twin goes on a trip near the speed of light and comes home younger than the twin who stayed at home. This is not a paradox: time passes at a slower rate when measured from a frame moving with respect to the object. In relativistic physics, an observation must always be qualified by specifying the state of motion of the observer, its reference frame.
QUANTUM MECHANICS:-
In quantum mechanics, which deals with the behavior of very small objects, it is not possible to observe a system without changing the system, and the "observer" must be considered part of the system being observed. In isolation, quantum objects are represented by a wave function which often exists in a superposition or mixture of different states. However, when an observation is made to determine the actual location or state of the object, it always finds the object in a single state, not a "mixture". The interaction of the observation process appears to "collapse" the wave function into a single state. So any interaction between an isolated wave function and the external world that results in this wave function collapse is called an observation or measurement, whether or not it is part of a deliberate observation process.

INTERVIEW SCHEDULE:-
Interview is a face to face or one to one situation in which the interviewer gathers information about the behaviour, problems and future plans of the pupil. It is also designed to assist the pupil to understand himself and his environment, so as to be able to solve his problems or modify his plans. There are various types of interviews depending upon their purpose and design.
When interview is used as a tool for gathering data for research purpose it is called “research interview” When interview is used for clinical purpose or to secure information about a pupil’s problems, his past history, adjustment patterns etc. it is called clinical interview. Similarly, interview can cover only one pupil at a time or a group of pupils. Accordingly, interview can be “individual interview or group interview”. Interviews are also classified as “structured interview” and “unstructured interview.” But our concern is to have a clear-cut look on interview schedule.
Interview schedule is another procedure under self-reporting technique of individual data collection. In the interview the individual is made to answer several questions put to him related to a specific aspect in a face to face situation. In conducting interview the interviewer (guidance personnel) may use questions specified beforehand. This is called structured interview. If the interviewer doesn’t have any pre-specified questions while conducting interview, it is called unstructured interview. Besides the above types, interviews may be counseling interview, diagnostic interview, non-directive interview, authoritarian interview and non-authoritarian interview. For guidance purpose non directive interview seems to be most useful and helpful. The counselor follows the student’s needs, reflex and helps to clarify his feeling. He doesn’t inject his own ideas into the conversation by questions or suggestions or by giving information or advice.
USES OF INTERVIEW SCHEDULE:- The interview schedule has the following uses:-
1. It is self-reporting technique which provides considerable flexibility to the interviewer.
2. Questions can be clarified, if necessary the interview can be given an opportunity to qualify or modify his answer and the interviewer can carefully observe the individual during the session, noting down the feeling attached to his answer the topic or cases when he seems to be evasive “and areas on which he is most vocal.
3. If the interviewer is experienced and trained, he can go beyond external purposes of the interview and he understands his inner feelings, wishes, desires, likes and dislikes.
4. While interviewing, the behavior of the subject can be observed and information with regard to his emotional complex can be observed which will be greatly helpful for individual guidance.
5. It is a potent and indispensable tool for getting data that no other research tool can do.
6. It can be adaptable, capable of being used with all types of individuals.
LIMITATIONS OF INTERVIEW SCHEDULE:- The Interview schedule has the following limitations so far as its application in the field of guidance is concerned:-
1. It is extremely time consuming process.
2. Information obtained is not standardized from one person to another.
3. It suffers from bias of the interviewer.
4. Sometimes interviewers own Masses influence the questions that are asked.
5. Some of the interviewers are becoming too rigid in taking judgments, while some others get influenced by others’ judgments.
6. A great deal of differences are found among the interviewers. As a result, the results obtained can’t be called reliable.
7. Uniformity can’t be maintained from one interview situation to another. In spite of the above limitations, interview technique may be quite useful for guidance. If the interviewer is trained and if he possesses professional knowledge manners, maturity, objectivity, adequacy, well-defined social values, the interview technique can get a high achieving situation in individual guidance service.

QUESTIONNAIRE:-
A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. Although they are often designed for statistical analysis of the responses, this is not always the case. The questionnaire was invented by the Statistical Society of London in 1838. A copy of the instrument is published in the Journal of the

Statistical Society, Volume 1, Issue 1,1838, pages 5-13.
Questionnaires have advantages over some other types of surveys in that they are cheap, do not require as much effort from the questioner as verbal or telephone surveys, and often have standardized answers that make it simple to compile data. However, such standardized answers may frustrate users. Questionnaires are also sharply limited by the fact that respondents must be able to read the questions and respond to them. Thus, for some demographic groups conducting a survey by questionnaire may not be concrete.

TYPES:-
A distinction can be made between questionnaires with questions that measure separate variables, and questionnaires with questions that are aggregated into either a scale or index. Questionnaires with questions that measure separate variables, could for instance include questions on:
• Preferences (e.g. political party)
• Behaviors (e.g. food consumption)
• facts (e.g. gender) Questionnaires with questions that are aggregated into either a scale or index, include for instance questions that measure:-
• Latent traits (e.g. personality traits such as extroversion)
• attitudes (e.g. towards immigration)
• an index (e.g. Social Economic Status)

EXAMPLES:-
A food frequency questionnaire (FFQ) is a questionnaire the type of diet consumed in people, and may be used as a research instrument. Examples of usages include assessment of intake of vitamins or toxins such as acrylamide.

QUESTIONNAIRE CONSTRUCTION
QUESTION TYPES:-
Usually, a questionnaire consists of a number of questions that the respondent has to answer in a set format. A distinction is made between open-ended and closed-ended questions. An open-ended question asks the respondent to formulate his own answer, whereas a closed-ended question has the respondent pick an answer from a given number of options. The response options for a closed-ended question should be exhaustive and mutually exclusive. Four types of response scales for closed-ended questions are distinguished:-
• Dichotomous, where the respondent has two options
• Nominal-polytomous, where the respondent has more than two unordered options
• Ordinal-polytomous, where the respondent has more than two ordered options
• (Bounded)Continuous, where the respondent is presented with a continuous scale
A respondent's answer to an open-ended question is coded into a response scale afterwards. An example of an open-ended question is a question where the testie has to complete a sentence (sentence completion item).

QUESTION SEQUENCE:- In general, questions should flow logically from one to the next. To achieve the best response rates, questions should flow from the least sensitive to the most sensitive, from the factual and behavioral to the attitudinal, and from the more general to the more specific.

There typically is a flow that should be followed when constructing a questionnaire in regards to the order that the questions are asked. The order is as follows:-
• Screens
• Warm-ups
• Transitions
• Skips
• Difficult
• Changing Formula Screens are used as a screening method to find out early whether or not someone should complete the questionnaire. Warm-ups are simple to answer, help capture interest

in the survey, and may not even pertain to research objectives. Transition questions are used to make different areas flow well together. Skips include questions similar to “If yes, then answer question 3. If no, then continue to question 5.” Difficult questions are towards the end because the respondent is in “response mode.” Also, when completing an online questionnaire, the progress bars lets the respondent know that they are almost done so they are more willing to answer more difficult questions. Classification, or demographic question should be at the end because typically they can feel like personal questions which will make respondents uncomfortable and not willing to finish survey.

Q.2 WHAT IS A TEST? AND WHAT ARE DIFFERENT TYPES OF TESTS USED IN EDUCATIONAL RESEARCH. (20)
ANSWER:-

TEST:-
A test or examination (informally, exam) is an assessment intended to measure a test-taker’s knowledge, skill, aptitude, physical fitness, or classification in many other topics (e.g., beliefs). A test may be administered verbally, on paper, on a computer, or in a confined area that requires a test taker to physically perform a set of skills. Tests vary in style, rigor and requirements. For example, in a closed book test, a test taker is often required to rely upon memory to respond to specific items whereas in an open book test, a test taker may use one or more supplementary tools such as a reference book or calculator when responding to an item. A test may be administered formally or informally. An example of an informal test would be a reading test administered by a parent to a child. An example of a formal test would be a final examination administered by a teacher in a classroom or an I.Q. test administered by a psychologist in a clinic. Formal testing often results in a grade or a test score. A test score may be interpreted with regards to a norm or criterion, or occasionally both. The norm may be established independently, or by statistical analysis of a large number of participants. An exam is meant to test a child’s knowledge or willingness to give time to manipulate that subject.

TESTS USED IN EDUCATIONAL RESEARCH
WHAT IS A ‘T-TEST’
A t-test is an analysis of two population’s means through the use of statistical examination; a t-test with two samples is commonly used with small sample sizes, testing the difference between the samples when the variances of two normal distributions are not known. A t-test looks at the t-statistic, the t-distribution and degrees of freedom to determine the probability of difference between populations; the test statistic in the test is known as the t-statistic. To conduct a test with three or more variables, an analysis of variance (ANOVA) must be used.

BREAKING DOWN:- ‘T-Test’ A form of hypothesis testing, the t-test is just one of many tests used for this purpose. Statisticians must use tests other than the t-test to examine more variables, as well as for test with larger sample sizes. For a large sample size, statisticians use a z-test. Other testing options include the chi-square test and the f-test.

STATISTICAL ANALYSIS OF THE T-TEST:-
The formula used to calculate the test is a ratio: The top portion of the ratio is the easiest portion to calculate and understand, as it is simply the difference between the means or averages of the two samples. The lower half of the ratio is a measurement of the dispersion, or variability, of the scores. The bottom part of this ratio is known as the standard error of the difference. To compute this part of the ratio, the variance for each sample is determined and is then divided by the number of individuals the compose the sample, or group. These two values are then added together, and a square root is taken of the result.
Example:-

For example, consider that an analyst wants to study the amount that ennsylvanians and Californians spend, per month, on clothing. It would not be practical to record the spending habits of every individual (or family) in both states, thus a sample of spending habits is taken from a selected group of individuals from each state. The group may be of any small to moderate size — for this example, assume that the sample group is 200 individuals.
The average amount for Pennsylvanians comes out to $500; the average amount for Californians is $1,000. The t-test questions whether the different between the groups is representative of a true difference between people in Pennsylvania and people in California in general or if it is likely a meaningless statistical difference. In this example, if, theoretically, all Pennsylvanians spent $500 per month on clothing and all Californians spent $1,000 per month on clothing, it is highly unlikely that 200 randomly selected individuals all spent that exact amount, respective to state. Thus, if an analyst or statistician yielded the results listed in the example above, it is safe to conclude that the difference between sample groups is indicative of a significant difference between the populations, as a whole, of each state.

WHAT IS ANOVA TEST?
Analysis of variance (ANOVA) tests the hypothesis that the means of two or more populations are equal. ANOVAs assess the importance of one or more factors by comparing the response variable means at the different factor levels. The null hypothesis states that all population means (factor level means) are equal while the alternative hypothesis states that at least one is different.
To perform an ANOVA, you must have a continuous response variable and at least one categorical factor with two or more levels. ANOVAs require data from approximately normally distributed populations with equal variances between factor levels. However, ANOVA procedures work quite well even if the normality assumption has been violated, unless one or more of the distributions are highly skewed or if the variances are quite different. Transformations of the original dataset may correct these violations. For example, you design an experiment to assess the durability of four experimental carpet products. You put a sample of each carpet type in ten homes and you measure durability after 60 days. Because you are examining one factor (carpet type) you use a one-way ANOVA.
If the p-value is less than your alpha, then you conclude that at least one durability mean is different. For more detailed information about the differences between specific means, use a multiple comparison method such as Tukey's.
The name "analysis of variance" is based on the approach in which the procedure uses variances to determine whether the means are different. The procedure works by comparing the variance between group means versus the variance within groups as a way of determining whether the groups are all part of one larger population or separate populations with different characteristics. Minitab has different types of ANOVAs to allow for additional factors, types of factors, and different designs to suit your specific needs.
ANOVA = type Model and design properties
One-way = One fixed factor (levels set by investigator) which can have either an unequal (unbalanced) or equal (balanced) number of observations per treatment.
Balanced = Model may contain any number of fixed and random factors (levels are randomly selected), and crossed and nested factors, but requires a balanced design.
General linear = Expands on Balanced ANOVAs by allowing unbalanced designs and covariates model (continuous variables).

WHAT IS CHI-SQUARED TEST?
A chi-squared test, also written as X2 test, is any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Chi-squared tests are often constructed from a sum of squared errors, or through the sample variance. Test statistics that follow a chi-squared distribution arise from an assumption of independent normally distributed data, which is valid in many cases due to the central limit theorem. A chi-

squared test can be used to attempt rejection of the null hypothesis that the data are independent. Also considered a chi-squared test is a test in which this is asymptotically true, meaning that the sampling distribution (if the null hypothesis is true) can be made to approximate a chi-squared distribution as closely as desired by making the sample size large enough. The chi-squared test is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more

EXAMPLES OF CHI-SQUARED TESTS WITH SAMPLES:-

One test statistic that follows a chi-squared distribution exactly is the test that the variance of a normally distributed population has a given value based on a sample variance. Such tests are uncommon in practice because the true variance of the population is usually unknown. However, there are several statistical tests where the chi-squared distribution is approximately valid:

Pearson's chi-squared test

Pearson's chi-squared test, also known as the chi-squared goodness-of-fit test or chi-squared test for independence. It was developed in the year 1900. When the chi-squared test is mentioned without any modifiers or other precluding contexts, this test is often meant. For an exact test used in place of the chi-squared test, see Fisher's exact test.

YATES'S CORRECTION FOR CONTINUITY:- using the chi-squared distribution to interpret Pearson's chi-squared statistic requires one to assume that the discrete probability of observed binomial frequencies in the table can be approximated by the continuous chi-squared distribution. This assumption is not quite correct, and introduces some error. To reduce the error in approximation, Frank Yates suggested a correction for continuity that adjusts the formula for Pearson's chi-squared test by subtracting 0.5 from the difference between each observed value and its expected value in a 2 x 2 contingency table.(1) This reduces the chi-squared value obtained and thus increases its p-value.

Other chi-squared tests

- Cochran—Mantel—Haenszel chi-squared test.
- McNemar's test, used in certain 2 x 2 tables with pairing
- Tukey's test of additivity
- The portmanteau test in time-series analysis, testing for the presence of autocorrelation
- Likelihood-ratio tests in general statistical modelling, for testing whether there is evidence of the need to move from a simple model to a more complicated one (where the simple model is nested within the complicated one).

CHI-SQUARED TEST FOR VARIANCE IN A NORMAL POPULATION

If a sample of size n is taken from a population having a normal distribution, then there is a result (see distribution of the sample variance) which allows a test to be made of whether the variance of the population has a pre-determined value. For example, a manufacturing process might have been in stable condition for a long period, allowing a value for the variance to be determined essentially without error. Suppose that a variant of the process is being tested, giving rise to a small sample of n product items whose variation is to be tested. The test statistic T in this instance could be set to be the sum of squares about the sample mean, divided by the nominal value for the variance (i.e. the value to be tested as holding). Then T has a chi-squared distribution with n – 1 degrees of freedom. For example, if the sample size is 21, the acceptance region for T with a significance level of 5% is between 9.59 and 34.17.

EXAMPLE CHI-SQUARED TEST FOR CATEGORICAL DATA:-

Suppose there is a city of 1 million residents with four neighborhoods: A, B, C, and D. A random sample of 650 residents of the city is taken and their occupation is recorded as "white collar", "blue collar", or "no collar". The null hypothesis is that each person's neighborhood of residence is independent of the person's occupational classification.

A related issue is a test of homogeneity. Suppose that instead of giving every resident of each of the

four neighborhoods an equal chance of inclusion in the sample, we decide in advance how many residents of each neighborhood to include. Then each resident has the same chance of being chosen as do all residents of the same neighborhood, but residents of different neighborhoods would have different probabilities of being chosen if the four sample sizes are not proportional to the populations of the four neighborhoods. In such a case, we would be testing “homogeneity” rather than “independence”. The question is whether the proportions of blue-collar, white-collar, and no-collar workers in the four neighborhoods are the same. However, the test is done in the same way.

APPLICATIONS
In cryptanalysis, chi-squared test is used to compare the distribution of plaintext and (possibly) decrypted cipher text. The lowest value of the test means that the decryption was successful with high probability this method can be generalized for solving modern cryptographic problems.

Q.3 DEFINE SAMPLING. WHAT ARE DIFFERENT SAMPLING DESIGNS USED IN EDUCATIONAL RESEARCH? (20)
ANSWER:-
SAMPLING:-
When you collect any sort of data, especially quantitative data, whether observational, through surveys or from secondary data, you need to decide which data to collect and from whom. This is called the sample. There are a variety of ways to select your sample, and to make sure that it gives you results that will be reliable and credible.
THE DIFFERENCE BETWEEN POPULATION AND SAMPLE:-
Ideally, research would collect information from every single member of the population that you are studying. However, most of the time that would take too long and so you have to select a suitable sample: a subset of the population.
PRINCIPLES BEHIND CHOOSING A SAMPLE:-
The idea behind selecting a sample is to be able to generalize your findings to the whole population, which means that your sample must be: Representative of the population. In other words, it should contain similar proportions of subgroups as the whole population, and not exclude any particular groups, either by method of sampling or by design, or by who chooses to respond.
• Large enough to give you enough information to avoid errors. It does not need to be a specific proportion of your population, but it does need to be at least a certain size so that you know that your answers are likely to be broadly correct. If your sample is not representative, you can introduce bias into the study. If it is not large enough, the study will be imprecise.
However, if you get the relationship between sample and population right, then you can draw strong conclusions about the nature of the population.
SAMPLE SIZE:- how long is a piece of string? How large should your sample be? It depends how precise you want the answer. Larger samples generally give more precise answers.
Your desired sample size depends on what you are measuring and the size of the error that you’re prepared to accept. For example:-
To estimate a proportion in a population:
Sample size =( (z-score)’ x p(1-p) J + (margin of error(‘
The margin of error is what you are prepared to accept (usually between 1% and 10%); The z-score, also called the z value, is found from statistical tables and depends on the confidence interval chosen (90%, 95% and 99% are commonly used, so choose which one you want); p is your estimate of what the proportion is likely to be. You can often estimate p from previous research, but if you can’t do that then use 0.5. To estimate a population mean: Margin of error = t x (s + square root of the sample size). Margin of error is what you are prepared to accept (usually between 1% and 10%);; As long as the sample size is larger than about 30, t is equivalent to the z score, and available from statistical tables as before; s is the standard deviation, which is usually guessed, based on previous experience or other research.

SELECTING A SAMPLE
Probability sampling is where the probability of each person or thing being part of the sample is known. Non-probability sampling is where it is not.

PROBABILITY SAMPLING:- Probability sampling methods allow the researcher to be precise about the relationship between the sample and the population. This means that you can be absolutely confident about whether your sample is representative or not, and you can also put a number on how certain you are about your findings (this number is called the significance, and is discussed further in our page on Statistical Analysis). In simple random sampling, every member of the population has an equal chance of being chosen. The drawback is that the sample may not be genuinely representative. Small but important sub-sections of the population may not be included. Researchers therefore developed an alternative method called stratified random sampling. This method divides the population into smaller homogeneous groups, called strata, and then takes a random sample from each stratum.

PROPORTIONAL STRATIFIED RANDOM SAMPLING:- takes the same proportion from each stratum, but again suffers from the disadvantage that rare groups will be badly represented. Non-proportional stratified sampling therefore takes a larger sample from the smaller strata, to ensure that there is a large enough sample from each stratum.

SYSTEMATIC RANDOM SAMPLING:- relies on having a list of the population, which should ideally be randomly ordered. The researcher then takes every nth name from the list.
CLUSTER SAMPLING:- is designed to address problems of a widespread geographical population. Random sampling from a large population is likely to lead to high costs of access. This can be overcome by dividing the population into clusters, selecting only two or three clusters, and sampling from within those. For example, if you wished to find out about the use of transport in urban areas in the UK, you could randomly select just two or three cities, and then sample fully from within these.
NON-PROBABILITY SAMPLING:- Using non-probability sampling methods, it is not possible to say what is the probability of any particular member of the population being sampled. Although this does not make the sample 'bad', researchers using such samples cannot be as confident in drawing conclusions about the whole population.
CONVENIENCE SAMPLING:- selects a sample on the basis of how easy it is to access. Such samples are extremely easy to organize, but there is no way to guarantee whether they are representative.
QUOTA SAMPLING:- divides the population into categories, and then selects from within categories until a sample of the chosen size is obtained within that category. Some market research is this type, which is why researchers often ask for your age: they are checking whether you will help them meet their quotas for particular age groups.
PURPOSIVE SAMPLING:- is where the researcher only approaches people who meet certain criteria, and then checks whether they meet other criteria. Again, market researchers out and about with clipboards often use this approach: for example, if they are looking to examine the shopping habits of men aged between 20 and 40, they would only approach men, and then ask their age.
SNOWBALL SAMPLING is where the researcher starts with one person who meets their criteria, and then uses that person to identify others. This works well when your sample has very specific criteria: for example, if you want to talk to workers with a particular set of responsibilities, you might approach one person with that set, and ask them to introduce you to others.

Q.4 WHAT IS A RESEARCH PROPOSAL? EXPLAIN MAJOR PARTS OF A RESEARCH PROPOSAL.(20)
ANSWER:-
RESEARCH PROPOSAL:- A research proposal is a concise and coherent summary of your proposed research. It sets out the central issues or questions that you intend to address. It outlines the general area of study within which your research falls, referring to the current state of knowledge and any recent debates on the topic:-

I. INTRODUCTION AND THEORETICAL FRAMEWORK
A:- “The introduction is the part of the paper that provides readers with the background information for the research reported in the paper. Its purpose is to establish a framework for the research, so that readers can understand how it is related to other research” (Wilkinson, 1991, p. 96).

B:- IN AN INTRODUCTION, THE WRITER SHOULD
1. create reader interest in the topic,
2. lay the broad foundation for the problem that leads to the study,
3. place the study within the larger context of the scholarly literature, and
4. reach out to a specific audience. (Creswell, 1994, p. 42)

C:- If a researcher is working within a particular theoretical framework/line of inquiry, the theory or line of inquiry should be introduced and discussed early, preferably in the introduction or literature review. Remember that the theory/line of inquiry selected will inform the staterinent of the problem, rationale for the study, questions and hypotheses, selection of instruments, and choice of methods. Ultimately, findings will be discussed in terms of how they relate to the theory/line of inquiry that undergirds the study.
D:- Theories, theoretical frameworks, and lines of inquiry may be differently handled in quantitative and qualitative endeavors.
1. “In quantitative studies, one uses theory deductively and places it toward the beginning of the plan for a study. The objective is to test or verify theory. One thus begins the study advancing a theory, collects data to test it, and reflects on whether the theory was confirmed or disconfirmed by the results in the study. The theory becomes a framework for the entire study, an organizing model for the research questions or hypotheses for the data collection procedure” (Creswell, 1994, pp. 87-88).
2. In qualitative inquiry, the use of theory and of a line of inquiry depends on the nature of the investigation. In studies aiming at “grounded theory,” for example, theory and theoretical tenets emerge from findings. Much qualitative inquiry, however, also aims to test or verify theory, hence in these cases the theoretical framework, as in quantitative efforts, should be identified and discussed early on.

II. STATEMENT OF THE PROBLEM
A. “The problem statement describes the context for the study and it also identifies the general analysis approach” (Wiersma, 1995, p. 404).
B. “A problem might be defined as the issue that exists in the literature, theory, or practice that leads to a need for the study” (Creswell, 1994, p. 50).
C. It is important in a proposal that the problem stand out—that the reader can easily recognize it. Sometimes, obscure and poorly formulated problems are masked in an extended discussion. In such cases, reviewers and/or committee members will have difficulty recognizing the problem.
D. A problem statement should be presented within a context, and that context should be provided and briefly explained, including a discussion of the conceptual or theoretical framework in which it is embedded. Clearly and succinctly identify and explain the problem within the framework of the theory or line of inquiry that undergirds the study. This is of major importance in nearly all proposals and requires careful attention. It is a key element that associations such as AERA and APA look for in proposals. It is essential in all quantitative research and much qualitative research.
E. State the problem in terms intelligible to someone who is generally sophisticated but who is relatively uninformed in the area of your investigation.
F. Effective problem statements answer the question “Why does this research need to be conducted.” If a researcher is unable to answer this question clearly and succinctly, and without resorting to hyper speaking (i.e., focusing on problems of macro or global proportions that certainly will not be informed or alleviated by the study), then the statement of the problem will come off as ambiguous and diffuse.
G. For conference proposals, the statement of the problem is generally incorporated into the introduction; academic proposals for theses or dissertations should have this as a separate section.

PURPOSE OF THE STUDY
A. “The purpose statement should provide a specific and accurate synopsis of the overall purpose of the study” (Locke, Spirduso, & Silverman, 1987, p. 5). If the purpose is not clear to the writer, it cannot be clear to the reader.

B. Briefly define and delimit the specific area of the research. You will revisit this in greater detail in a later section.
C. Foreshadow the hypotheses to be tested or the questions to be raised, as well as the significance of the study. These will require specific elaboration in subsequent sections.
D. The purpose statement can also incorporate the rationale for the study. Some committees prefer that the purpose and rationale be provided in separate sections, however.
E. Key points to keep in mind when preparing a purpose statement.
1. Try to incorporate a sentence that begins with "The purpose of this study is …" This will clarify your own mind as to the purpose and it will inform the reader directly and explicitly.
2. Clearly identify and define the central concepts or ideas of the study. Some committee Chairs prefer a separate section to this end. When defining terms, make a judicious choice between using descriptive or operational definitions.
3. Identify the specific method of inquiry to be used.
4. Identify the unit of analysis in the study.


IV. REVIEW OF THE LITERATURE
A. "The review of the literature provides the background and context for the research problem. It should establish the need for the research and indicate that the writer is knowledgeable about the area" (Wiersma, 1995, p. 406).
B. The literature review accomplishes several important things.
1. It shares with the reader the results of other studies that are closely related to the study being reported (Fraenkel & Wallen, 1990).
2. It relates a study to the larger, ongoing dialogue in the literature about a topic, filling in gaps and extending prior studies (Marshall & Rossman, 1989).
3. It provides a framework for establishing the importance of the study, as well as a benchmark for comparing the results of a study with other findings.
4. It "frames" the problem earlier identified.
C. Demonstrate to the reader that you have a comprehensive grasp of the field and are aware of important recent substantive and methodological developments.
D. Delineate the "jumping-off place" for your study. How will your study refine, revise, or extend what is now known?
E. Avoid statements that imply that little has been done in the area or that what has been done is too extensive to permit easy summary. Statements of this sort are usually taken as indications that the writer is not really familiar with the literature.
F. In a proposal, the literature review is generally brief and to the point. Be judicious in your choice of exemplars—the literature selected should be pertinent and relevant (APA, 2001). Select and reference only the more appropriate citations. Make key points clearly and succinctly.
G. Committees may want a section outlining your search strategy—the procedures you used and sources you investigated (e.g., databases, journals, test banks, experts in the field) to compile your literature review. Check with your Chair.
V. QUESTIONS AND/OR HYPOTHESES
A. Questions are relevant to normative or census type research (How many of them are there? Is there a relationship between them?). They are most often used in qualitative inquiry, although their use in quantitative inquiry is becoming more prominent. Hypotheses are relevant to theoretical research and are typically used only in quantitative inquiry. When a writer states hypotheses, the reader is entitled to have an exposition of the theory that led to them (and of the assumptions underlying the theory). Just as conclusions must be grounded in the data, hypotheses must be grounded in the theoretical framework.
B. A research question poses a relationship between two or more variables but phrases the relationship as a question; a hypothesis represents a declarative statement of the relations between two or more variables (Kerlinger, 1979; Krathwohl, 1988).
C. Deciding whether to use questions or hypotheses depends on factors such as the purpose of the study, the nature of the design and methodology, and the audience of the research (at times even the taste and preference of committee members, particularly the Chair).
D. The practice of using hypotheses was derived from using the scientific method in social science inquiry. They have philosophical advantages in statistical testing, as researchers should be and tend to

be conservative and cautious in their statements of conclusions (Armstrong, 1974).
E. Hypotheses can be couched in four kinds of statements.
1. Literary null—a “no difference” form in terms of theoretical constructs. For example, “There is no relationship between support services and academic persistence of nontraditional-aged college women.” Or, “There is no difference in school achievement for high and low self-regulated students.”
2. Operational null—a “no difference” form in terms of the operation required to test the hypothesis. For example, “There is no relationship between the number of hours nontraditional-aged college women use the student union and their persistence at the college after their freshman year.” Or, “There is no difference between the mean grade point averages achieved by students in the upper and lower quartiles of the distribution of the Self-regulated Inventory.” The operational null is generally the preferred form of hypothesis-writing.
3. Literary alternative—a form that states the hypothesis you will accept if the null hypothesis is rejected, stated in terms of theoretical constructs. In other words, this is usually what you hope the results will show. For example, “The more that nontraditional-aged women use support services, the more they will persist academically.” Or, “High self-regulated students will achieve more in their classes than low self-regulated students.”
4. Operational alternative—Similar to the literary alternative except that the operations are specified. For example, “The more that nontraditional-aged college women use the student union, the more they will persist at the college after their freshman year.” Or, “Students in the upper quartile of the Self-regulated Inventory distribution achieve significantly higher grade point averages than do students in the lower quartile.”
F. In general, the null hypothesis is used if theory/literature does not suggest a hypothesized relationship between the variables under investigation; the alternative is generally reserved for situations in which theory/research suggests a relationship or directional interplay.
G. Be prepared to interpret any possible outcomes with respect to the questions or hypotheses. It will be helpful if you visualize in your mind=s eye the tables (or other summary devices) that you expect to result from your research (Guba, 1961).
H. Questions and hypotheses are testable propositions deduced and directly derived from theory (except in grounded theory studies and similar types of qualitative inquiry).
I. Make a clear and careful distinction between the dependent and independent variables and be certain they are clear to the reader. Be excruciatingly consistent in your use of terms. If appropriate, use the same pattern of wording and word order in all hypotheses.
VI. THE DESIGN–METHODS AND PROCEDURES:-
A. “The methods or procedures section is really the heart of the research proposal. The activities should be described with as much detail as possible, and the continuity between them should be apparent” (Wiersma, 1995, p. 409).
B. Indicate the methodological steps you will take to answer every question or to test every hypothesis illustrated in the Questions/Hypotheses section.
C. All research is plagued by the presence of confounding variables (the noise that covers up the information you would like to have). Confounding variables should be minimized by various kinds of controls or be estimated and taken into account by randomization processes (Guba, 1961). In the design section, indicate
1. the variables you propose to control and how you propose to control them, experimentally or statistically, and
2. the variables you propose to randomize, and the nature of the randomizing unit (students, grades, schools, etc.).
D. Be aware of possible sources of error to which your design exposes you. You will not produce a perfect, error free design (no one can). However, you should anticipate possible sources of error and attempt to overcome them or take them into account in your analysis. Moreover, you should disclose to the reader the sources you have identified and what efforts you have made to account for them.
E. SAMPLING
1. The key reason for being concerned with sampling is that of validity—the extent to which the interpretations of the results of the study follow from the study itself and the extent to which results may be generalized to other situations with other people (Shavelson, 1988).
2. Sampling is critical to external validity—the extent to which findings of a study can be generalized to people or situations other than those observed in the study. To generalize validly the findings from a

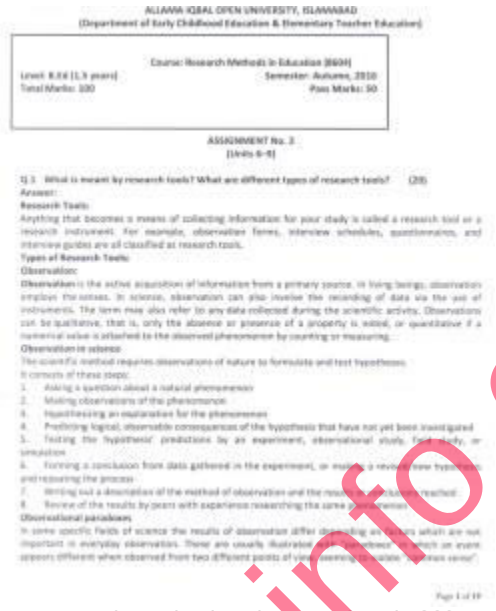
sample to some defined population requires that the sample has been drawn from that population according to one of several probability sampling plans. By a probability sample is meant that the probability of inclusion in the sample of any element in the population must be given a priori. All probability samples involve the idea of random sampling at some stage (Shavelson, 1988). In experimentation, two distinct steps are involved.
Random selection—participants to be included in the sample have been chosen at random from the same population. Define the population and indicate the sampling plan in detail.
Random assignment—participants for the sample have been assigned at random to one of the experimental conditions.
3. Another reason for being concerned with sampling is that of internal validity—the extent to which the outcomes of a study result from the variables that were manipulated, measured, or selected rather than from other variables not systematically treated. Without probability sampling, error estimates cannot be constructed (Shavelson, 1988).
4. Perhaps the key word in sampling is representative. One must ask oneself, "How representative is the sample of the survey population (the group from which the sample is selected) and how representative is the survey population of the target population (the larger group to which we wish to generalize)?"
5. When a sample is drawn out of convenience (a nonprobability sample), rationale and limitations must be clearly provided.
6. If available, outline the characteristics of the sample (by gender, race/ethnicity, socioeconomic status, or other relevant group membership).
7. Detail procedures to follow to obtain informed consent and ensure anonymity and/or confidentiality.

F. INSTRUMENTATION
1. Outline the instruments you propose to use (surveys, scales, interview protocols, observation grids). If instruments have previously been used, identify previous studies and findings related to reliability and validity. If instruments have not previously been used, outline procedures you will follow to develop and test their reliability and validity. In the latter case, a pilot study is nearly essential.
2. Because selection of instruments in most cases provides the operational definition of constructs, this is a crucial step in the proposal. For example, it is at this step that a literary conception such as "self-efficacy is related to school achievement" becomes "scores on the Mathematics Self-Efficacy Scale are related to Grade Point Average." Strictly speaking, results of your study will be directly relevant only to the instrumental or operational statements (Guba, 1961).
3. Include an appendix with a copy of the instruments to be used or the interview protocol to be followed. Also include sample items in the description of the instrument.
4. For a mailed survey, identify steps to be taken in administering and following up the survey to obtain a high response rate.
G. DATA COLLECTION
1. Outline the general plan for collecting the data. This may include survey administration procedures, interview or observation procedures. Include an explicit statement covering the field controls to be employed. If appropriate, discuss how you obtained entre.
2. Provide a general outline of the time schedule you expect to follow.
H. DATA ANALYSIS
1. Specify the procedures you will use, and label them accurately (e.g., ANOVA, MANCOVA, HLM, ethnography, case study, grounded theory). If coding procedures are to be used, describe in reasonable detail. If you triangulated, carefully explain how you went about it. Communicate your precise intentions and reasons for these intentions to the reader. This helps you and the reader evaluate the choices you made and procedures you followed.

2. Indicate briefly any analytic tools you will have available and expect to use (e.g., Ethnograph, NUDIST, AQUAD, SAS, SPSS, SYSTAT).
3. Provide a well thought-out rationale for your decision to use the design, methodology, and analyses you have selected.

VII. LIMITATIONS AND DELIMITATION
A. A limitation identifies potential weaknesses of the study. Think about your analysis, the nature of self-report, your instruments, the sample. Think about threats to internal validity that may have been

impossible to avoid or minimize—explain.
B. A delimitation addresses how a study will be narrowed in scope, that is, how it is bounded. This is the place to explain the things that you are not doing and why you have chosen not to do them—the literature you will not review (and why not), the population you are not studying (and why not), the methodological procedures you will not use (and why you will not use them). Limit your delimitation to the things that a reader might reasonably expect you to do but that you, for clearly explained reasons, have decided not to do.



ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Early Childhood Education & Elementary Teacher Education)

Course: Research Methods in Education (8604)
Level: B.Ed (1.5 years) Semester: Autumn, 2010
Total Marks: 100 Pass Marks: 50

ASSIGNMENT No. 2
(Units 6-9)

Q.1 What is meant by research tools? What are different types of research tools? (20)
Answer:
Research Tools:
Anything that becomes a means of collecting information for your study is called a research tool or a research instrument. For example, observation forms, interview schedules, questionnaires, and interview guides are all classified as research tools.
Types of Research Tools:
Observation:
Observation is the active acquisition of information from a primary source. In living beings, observation employs the senses. In science, observation can also involve the recording of data via the use of instruments. The term may also refer to any data collected during the scientific activity. Observations can be qualitative, that is, only the absence or presence of a property is noted, or quantitative if a numerical value is attached to the observed phenomenon by counting or measuring.
Observation in science
The scientific method requires observations of nature to formulate and test hypotheses.
It consists of these steps:
1. Asking a question about a natural phenomenon
2. Making observations of the phenomenon
3. Hypothesizing an explanation for the phenomenon
4. Predicting logical, observable consequences of the hypothesis that have not yet been investigated
5. Testing the hypothesis' predictions by an experiment, observational study, field study, or simulation
6. Forming a conclusion from data gathered in the experiment, or making a revised new hypothesis and repeating the process
7. Writing out a description of the method of observation and the results and conclusion reached
8. Review of the results by peers with experience researching the same phenomenon
Observational paradoxes
In some specific fields of science the results of observation differ depending on details which are not important in everyday observation. These are usually illustrative examples in which an event appears different when observed from two different points of view, leading to the "two views paradox".

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VIII. SIGNIFICANCE OF THE STUDY
A. Indicate how your research will refine, revise, or extend existing knowledge in the area under investigation. Note that such refinements, revisions, or extensions may have either substantive, theoretical, or methodological significance. Think pragmatically (i.e., cash value).
B. Most studies have two potential audiences: practitioners and professional peers. Statements relating the research to both groups are in order.
C. This can be a difficult section to write. Think about implications—how results of the study may affect scholarly research, theory, practice, educational interventions, curricula, counseling, policy. D. When thinking about the significance of your study, ask yourself the following questions.
1. What will results mean to the theoretical framework that framed the study?
2. What suggestions for subsequent research arise from the findings?
3. What will the results mean to the practicing educator?
4. Will results influence programs, methods, and/or interventions?
5. Will results contribute to the solution of educational problems?
6. Will results influence educational policy decisions?
7. What will be improved or changed as a result of the proposed research?
8. How will results of the study be implemented, and what innovations will come about?

Q.5 SUPPOSE YOU HAVE TO CONDUCT RESEARCH ON A TOPIC I.E. “PROBLEMS OF HEAD TEACHERS IN SECONDARY SCHOOLS IN LAHORE”. DEVELOP A RESEARCH PROPOSAL ON THIS TOPIC. (20)
ANSWER:

RESEARCH PROPOSAL
Education Sector

RESEARCH AREA
Research Area Problems of head teachers in secondary schools in Lahore

SUB-AREA
Teaching Staff Problems Research Topic What are the problems of the head teachers in secondary schools in Lahore Research question
• Aim of the Research
• What are the root causes of these problems which are facing by head teachers at secondary level in Lahore?
• Who is responsible for these problems?
• How can authorities overcome these problems?

IDENTIFY PROBLEM(S)
To identify the responsibilities of the head teachers in secondary schools in Punjab.
• To identify the responsibilities of the head teachers in secondary schools in Lahore
• Will compare the responsibilities, duties, rights, benefits of other districts' head teachers with Lahore at secondary level.
• To investigate the core issues of the head teachers
• To Find out the root causes behind these problems, which are facing by head teachers at secondary level in Lahore.

Approach, Selected Paradigm & Methodology:-
• Approach:-
1. Quantitative
2. Qualitatively
3. Data analysis Population and Sample Population All Head Teachers at Secondary Level in Lahore, who are currently working on their positions in 2016.
Sample
Male and female Head Teachers (accessible population) approx:30 Keeping in view the sensitivity of the issue, participants with reference to their education and background be selected.
Data Collection Tools
1. Questionnaire for the candidate.
2. Interviews with Specialized design Questionnaire.
3. Interviews from the higher authorities.

DATA COLLECTION PLAN
FIRSTLY,
By Questionnaire (Male/female head teachers at secondary level in Lahore)
SECONDLY:-
By interview with the policy makers of the educational system of Punjab Province.
THIRDLY:-
By interview with the Head Teachers working in Private Sector and in International Schools.
DATA ANALYSIS:-
The Collection of data from all three sources i.e general Questioner and specific design Questioner as well as interviews from the concern persons and make comparison with the other international Papers.

PLANNED OUTCOMES:-
• By the Investigative study of all the relevant material our are able to give some constructive and positive feedback to the policy maker to make positive changes in the educational structure to overcome the problems of the head teachers.
• By this Research our are able to overcome the problems of the head teachers, and will be able to provide facilities to our staff in accordance to modern educational sector.
BIBLIOGRAPHY WRITING SYSTEMS

• The APA (American Psychological Association) Style
• The footnote system.

BIBLIOGRAPHY

Use the appropriate and required format for listing references.